RUSCONI Olivia (2017): Conservation of endangered plants: a roadmap for the selection of translocation sites

Abstract

The conservation translocations of endangered plant species have become increasingly used techniques for withstanding the increase of species loss worldwide. However, a comprehensive approach that merges natural history with modern modelling techniques to identify suitable restoration sites does not exist today. In this study, I propose a hierarchical and holistic roadmap to identify appropriate reintroduction and introduction sites. The first step of this method includes modelling of bioclimatic and topographical niches of target species. In order to ensure a long-term viability of plants, current and future niches are modelled. The second step consists in analysing ecological parameters such as vegetation and soil of reference populations. In addition, life history traits of the target species are measured in order to establish a connexion between those biological traits and favourable environmental factors. All data are then statistically analysed to extract the most important parameters for the species' ecology. The third step is dedicated to the improvement of prediction maps obtained in step 1 using field data gathered in step 2 and the creation of a field guidebook with crucial parameters to be taken into account when performing translocations. In order to illustrate this methodology, this study focuses on the Lady's slipper Orchid (*Cypripedium calceolus* L., Orchidaceae) growing in Switzerland, for which conservation plans have existed for years, but generally unfruitful. The three steps of this roadmap allowed identifying sites for future reintroduction and introduction corresponding to this species' ecology for studied parameters. In addition, laboratory analysis of soils highlighted several potential causes of weak success of already-performed reintroductions, as well as a better understanding of the ecology of this rare species. This work can be considered as the basis of a broader roadmap that will include more ecological factors, such as biological, historical and demographical ones, in order to lead to more accurate identifications of suitable translocation sites.

Keywords: Endangered species, Restoration, Reintroduction, Ensemble forecasting, Ecological niche, Soil parameters, Plant vitality